Specification of Thermoelectric Module

TETC1-127018

Description

The 127 couples, 40 mm × 40 mm size single module is made of selected high performance ingot and fabricated by our unique "soft" processes to achieve superior cooling/heating performance. The module is able to run million thermal cycles in 70 ℃ temperature change range with less 3% degrading. It is good for the need of frequently cooling down and heating up to 100 ℃ applications. If higher operation or processing temperature is required, please specify, we can design and manufacture the custom made module according to your special requirements.

Features

- No moving parts, no noise, and solid-state
- Compact structure, small in size, light in weight
- Environmental friendly
- RoHS compliant
- Precise temperature control
- Exceptionally reliable in quality, high performance

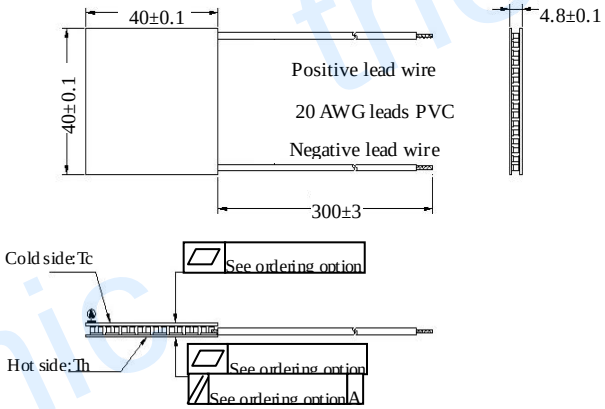
Application

- Food and beverage service refrigerator
- Portable cooler box for cars
- Liquid cooling
- Temperature stabilizer
- CPU cooler and scientific instrument
- Photonic and medical systems

Peformance Specification Sheet

Th(℃)	27	50	Hot side temperature at environment: dry air, N_2
DT_{max}(℃)	74	83	Temperature Difference between cold and hot side of the module when cooling capacity is zero at cold side
U_{max}(Voltage)	16.8	18.2	Voltage applied to the module at DT_{max}
I_{max}(amps)	3.03	3.03	DC current through the modules at DT_{max}
$Q_{C max}$(Watts)	31.7	34.1	Cooling capacity at cold side of the module under DT=0 ℃
AC resistance(ohms)	4.2	4.5	The module resistance is tested under AC
Tolerance (%)	± 10		For thermal and electricity parameters

Geometric Characteristics Dimensions in millimeters



Manufacturing Options

A. Solder:

1. T100: BiSn (Melting Point=138℃)
2. T200: CuSn (Melting Point= 227 ℃)

B. Sealant:

1. NS: No sealing (Standard)
2. SS: Silicone sealant
3. EPS: Epoxy sealant
4. Customer specify sealing

C. Ceramics:

1. Alumina (Al_2O_3, white 96%)(AlO)
2. Aluminum Nitride (AlN)

D. Ceramics Surface Options:

1. Blank ceramics (not metalized)
2. Metalized (Copper-Nickel plating)

Ordering Option

Suffix	Thickness (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:4.8±0.1	0:0.05/0.05	300±3/Specify
TF	1:4.8±0.05	1:0.025/0.025	300±3/Specify
TF	2:4.8±0.025	2:0.015/0.015	300±3/Specify
Eg. TF01: Thickness 4.8±0.1(mm) and Flatness 0.025/0.025(mm)			

Naming for the Module

TETC1- 127018- X - X - X - X

- Ceramics
- Flatness/ Parallelism
- Sealant
- Solder

TETC1- 127018- T100 -SS - TF01- AlO

T100: Solder, BiSn (Melting Point=138 ℃)

SS: Silicone sealing AlO: Alumina white 96%

TF01: Thickness ±0.1(mm) and Flatness/Parallelism 0.025/0.025(mm)

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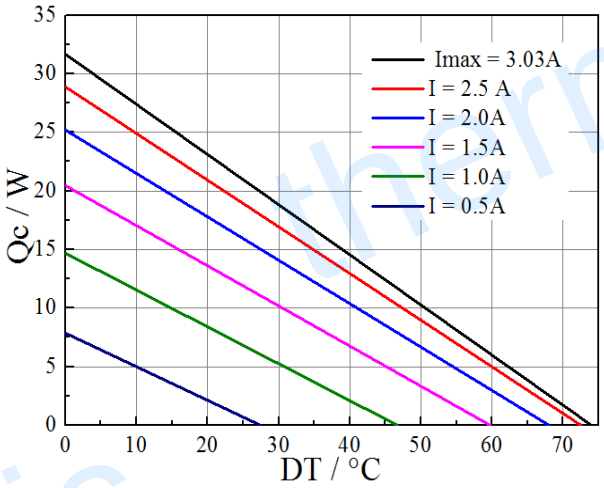
Operation Cautions

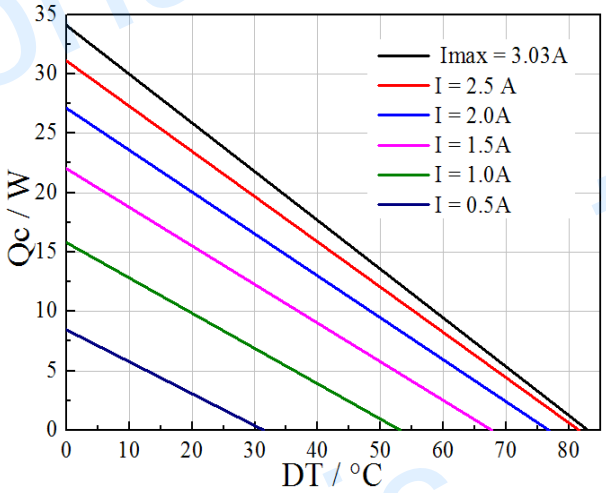
- Cold side of the module sticked on the object being cooled
- Hot side of the module mounted on a heat radiator
- Work under DC
- Operation below I_{max} or V_{max}
- Storage module below 100 ℃

Performance Curve

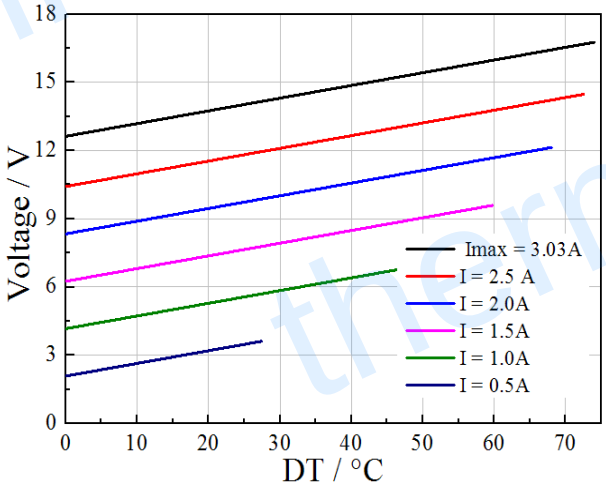
Performance Curves at Th=27 ℃

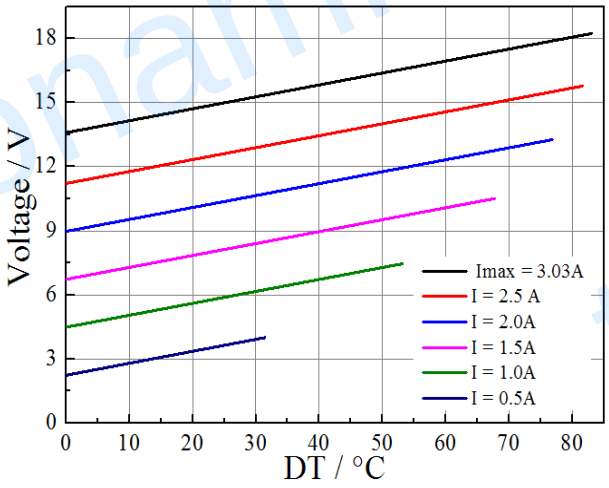


Performance Curves at Th=50 ℃

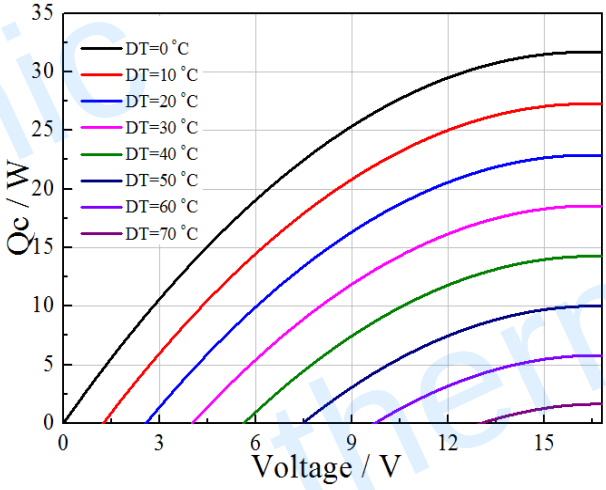


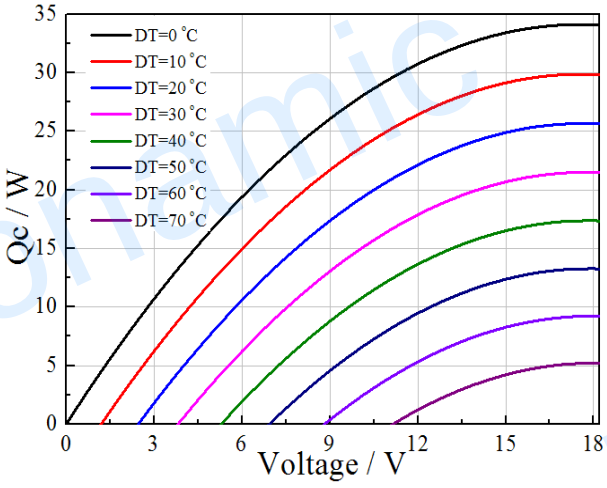
Standard Performance Graph Qc= f(DT)





Standard Performance Graph V= f(ΔT)





Standard Performance Graph Qc= f(V)

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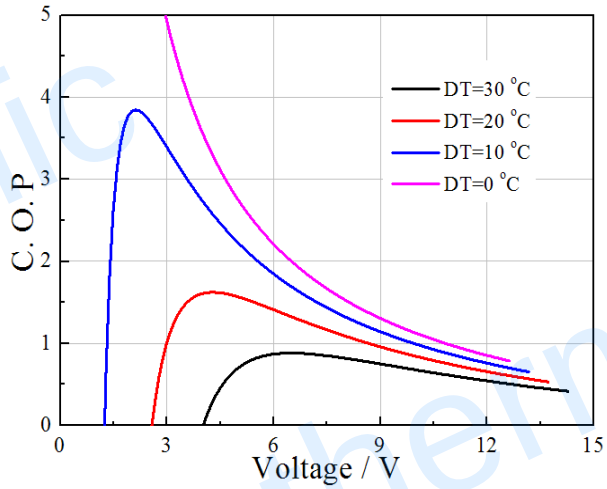
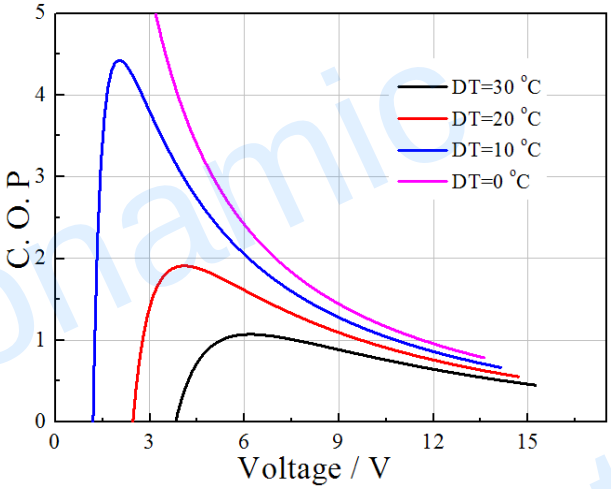
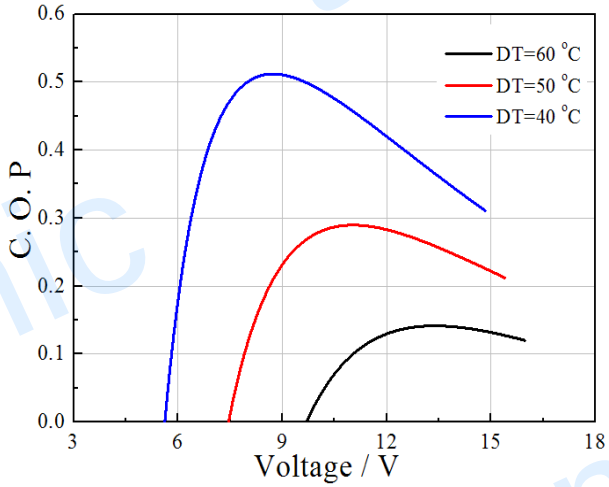
Performance Curves at Th=27 ℃

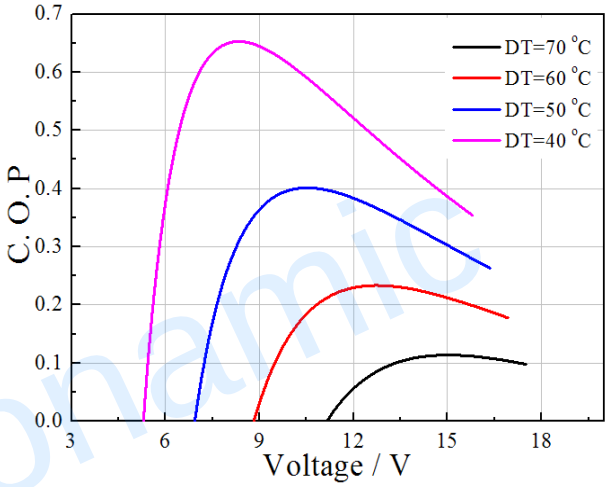


Performance Curves at Th=50 ℃



Standard Performance Graph COP = f(V) of ΔT ranged from 0 to 30 ˚C



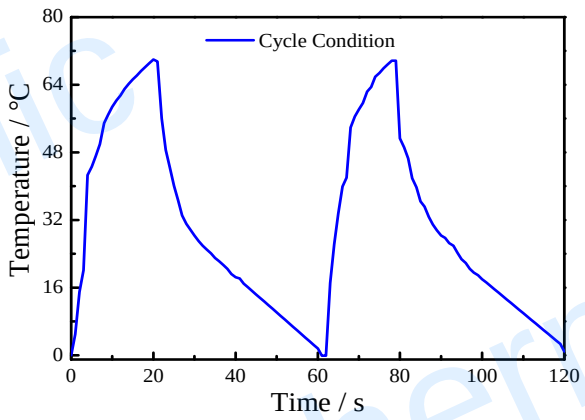


Standard Performance Graph COP = f(V) of ΔT ranged from 40 to 60/70 ˚C

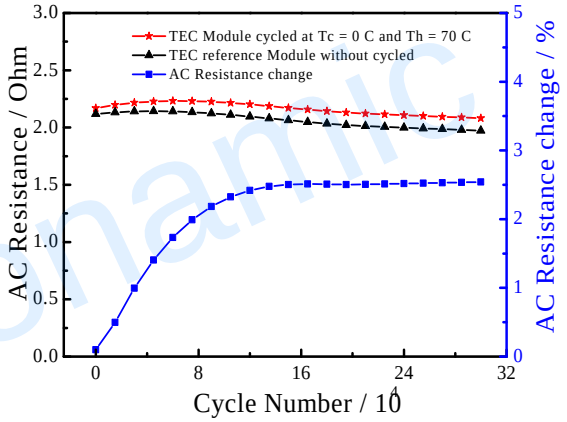
Remark: The coefficient of performance (COP) is the cooling power Qc/Input power (V × I).

A typical 127 couples module is fabricated by the unique "soft" process and has demonstrated that it only has 2.5% degrading after 300,000 thermal cycling. The below graphic shows that in beginning 120,000 cycles, it degrade about 2.5%, and then go on stable with very tiny degrading in further 180,000 thermal cycles. It is derived out that the modules can go over million thermal cycles.

TEC Thermal Cycle Lifetime Test On TETC1-12706



Typical cooling-heating cycle



The Chart for AC Resistance and AC Resistance Changes *vs* Cycle Number